YAK-54 EXP

48 inch Electric ARF

EXTREME FLIGHT
RADIO CONTROL™
STATE-OF-THE-ART R/C AEROBATIC AIRCRAFT AND ACCESSORIES

Greetings and congratulations on your purchase of the Extreme Flight RC Yak-54 EXP ARF! Like all of the EXP series, the YAK-54 excels at both 3D and precision maneuvers. It shares the long tail moment of the Extra, Edge and Laser which gives it great stability in high speed precision maneuvers and it also features the famous EXP elevator that allows for crazy pitch authority and great stability in high alpha maneuvers. When the CG is properly set the YAK-54 has minimal coupling and is a very neutral aircraft.
The YAK-54 EXP shares many of the attributes of the previous EXP airframes along with some new features. The motor box construction has been changed to the style of the 60 inch EXP aircraft as it has been proven in these airframes to be rock solid and easier to assemble in production. Due to customer feedback we have also changed the wing retention method to make it much easier to attach the wings to the fuselage. The wings are also slightly recessed into the fuselage sides which provides a much cleaner appearance and insures the wings will appear flush with the fuselage sides.

If repairs become necessary, the Ultracote colors used on the YAK-54 EXP are as follows:
<u>Red/White/Blue/Silver</u> color scheme: True Red #HANU866 (Oracover #023 Ferrari Red), White #HANU870 (Oracover #10 White), Deep Blue #HANU873 (Oracover #50 Blue) and Silver #HANU881 (Oracover #91 Silver).

<u>Red/White/Black</u> color scheme: True Red #HANU866 (Oracover #023 Ferrari Red), White #HANU870 (Oracover #10 White), Black #HANU874 (Oracover #71 Black).

Tips for Success:

1. Before starting assembly, take a few minutes to read the entire instruction manual to familiarize yourself with the assembly process.

2. Please take a few minutes and go over all the seams on the aircraft with a covering iron on a medium heat setting.

3. Use a fresh bottle of thin CA with a fine glue tip when attaching the CA hinges. This will ensure that the proper amount of CA wicks into the hinge and surrounding balsa wood and creates a proper bond between the wood and hinges. We are big fans of the Mercury line of adhesives as well as the glue tips provided by them.

4. Apply a couple drops of CA to high stress areas such as anti-rotation pins, landing gear mounts, servo trays and motor box joints .

5. All of the G10 control horns are the same with the exception of the elevator horn. Its base has been shortened to fit the depth of the elevator.

6. When applying decals, first clean the area where the decal will be applied with alcohol. Mist the area lightly with Windex before applying the decal which will allow you to properly position it, then use a rubber squeegee to push all of the liquid from under the decal. This will result in very few air pockets trapped under the decal.

7. Take the time to properly balance and trim your aircraft and set up rates and exponential values. Your flying experience will be greatly enhanced by doing this.

Please note: The assembly of the YAK-54 EXP is almost identical to the assembly process of the previously released EXP series aircraft. Most photos will show the Extra component assembly. Only assembly steps which differ will show the Yak components.

Items needed for completion

-Masking tape

-Hobby knife with #11 blades

-Razor saw

-Thin and medium CA. We highly recommend Mercury M5T thin and M100XF medium formulas as well as the Mercury glue tips.

-30 minute epoxy. The new Mercury adhesives Epoxies have worked very well for us.

-Blue Loctite.

-Silicon based glue (Zap-A-Dap-A-Goo, etc.)

-Electric drill with an assortment of small drill bits.

-Small flat head and Phillips head screw drivers.

-Standard and needle nose pliers.

-Metric balldriver or allen key set.

-4 sub micro metal geared servos. All flight testing was performed with Hitec HS-65MG and HS-5065MG digital servos and we strongly recommend the use of either of these high quality servos.

-Torque 2814T/820 Brushless Outrunner motor.

-Airboss Elite 45 Amp ESC.

-4S 2100-2700 mah LiPo battery.

-APC 12x6 E (NOT the slow fly version!) or XOAR 12x6 electric prop.

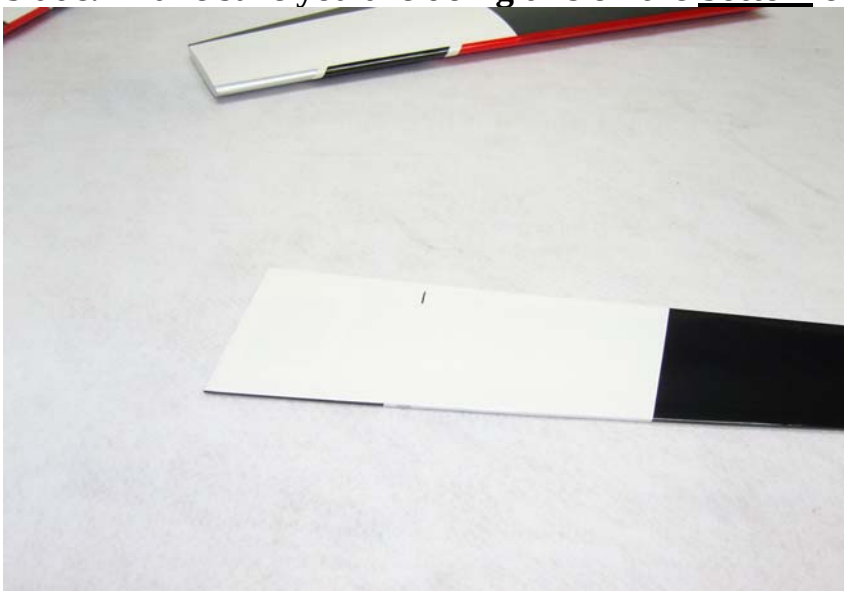
-52mm Extreme Flight spinner.

-2 18"-24" extensions for the 2 rear servos and 2 6"-8" extensions to go between the receiver and the aileron servo leads. We recommend the 28 or 32 AWG extensions to save weight.

-Adhesive backed Velcro and Velcro strap for battery retention.

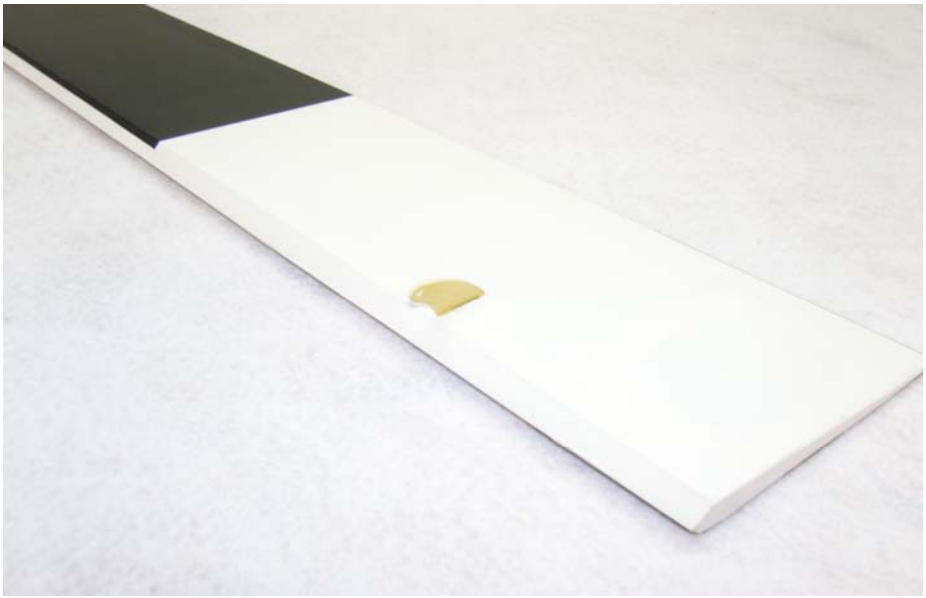
Let's begin!

1. Locate the 2 wing panels with ailerons as well as the 2 G10 aileron control horns. Remove the ailerons from the wing and remove the covering over the slot for the aileron horn on the bottom of the aileron with a sharp hobby blade. Make sure you are doing this on the <u>bottom</u> of the aileron!

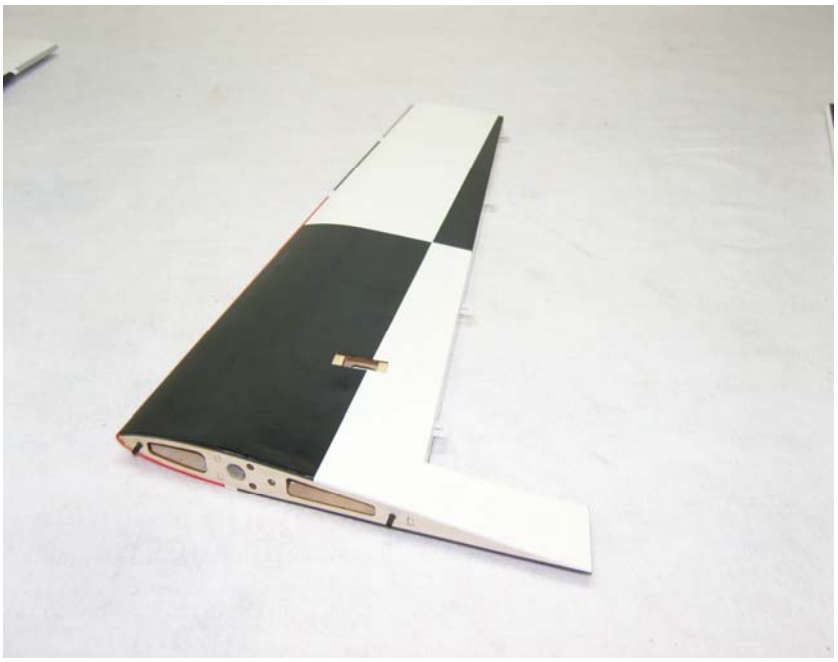


2. Scuff the portion of the control horn that will be glued into the aileron with sandpaper.

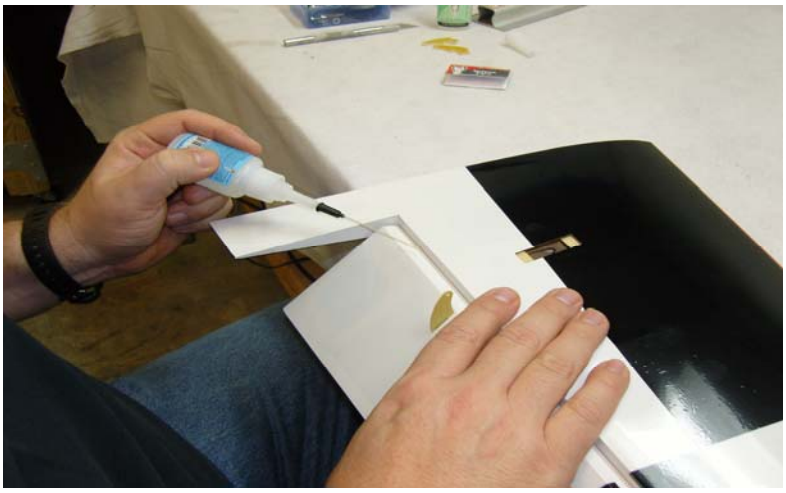
3. Use a glue tip on your bottle of medium CA and apply glue to the slot as well as to both sides of the control horn. Insert the control horn into the slot and make sure it seats properly against the surface of the aileron.



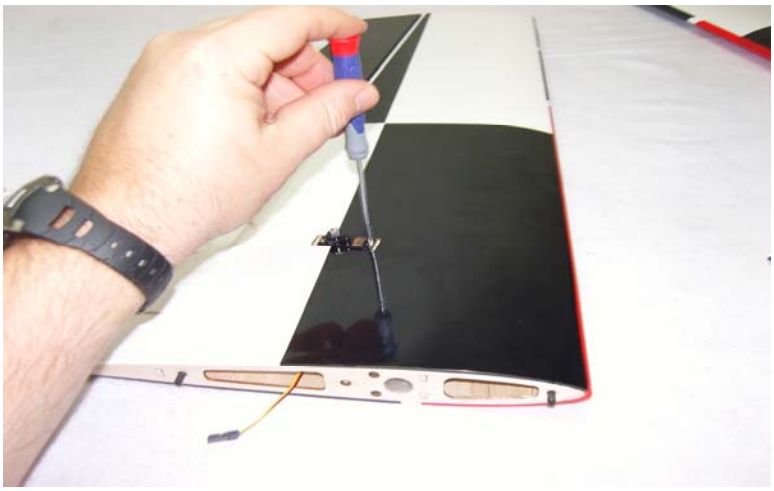
4. Remove the covering from the aileron servo location and make sure the hinges are centered in their slots.



5. Slide the aileron into position on the hinges and secure with several drops of fresh thin CA. This process is much easier and more effective if a fine glue tip is used. Make sure to deflect the surface as pictured while applying the CA.



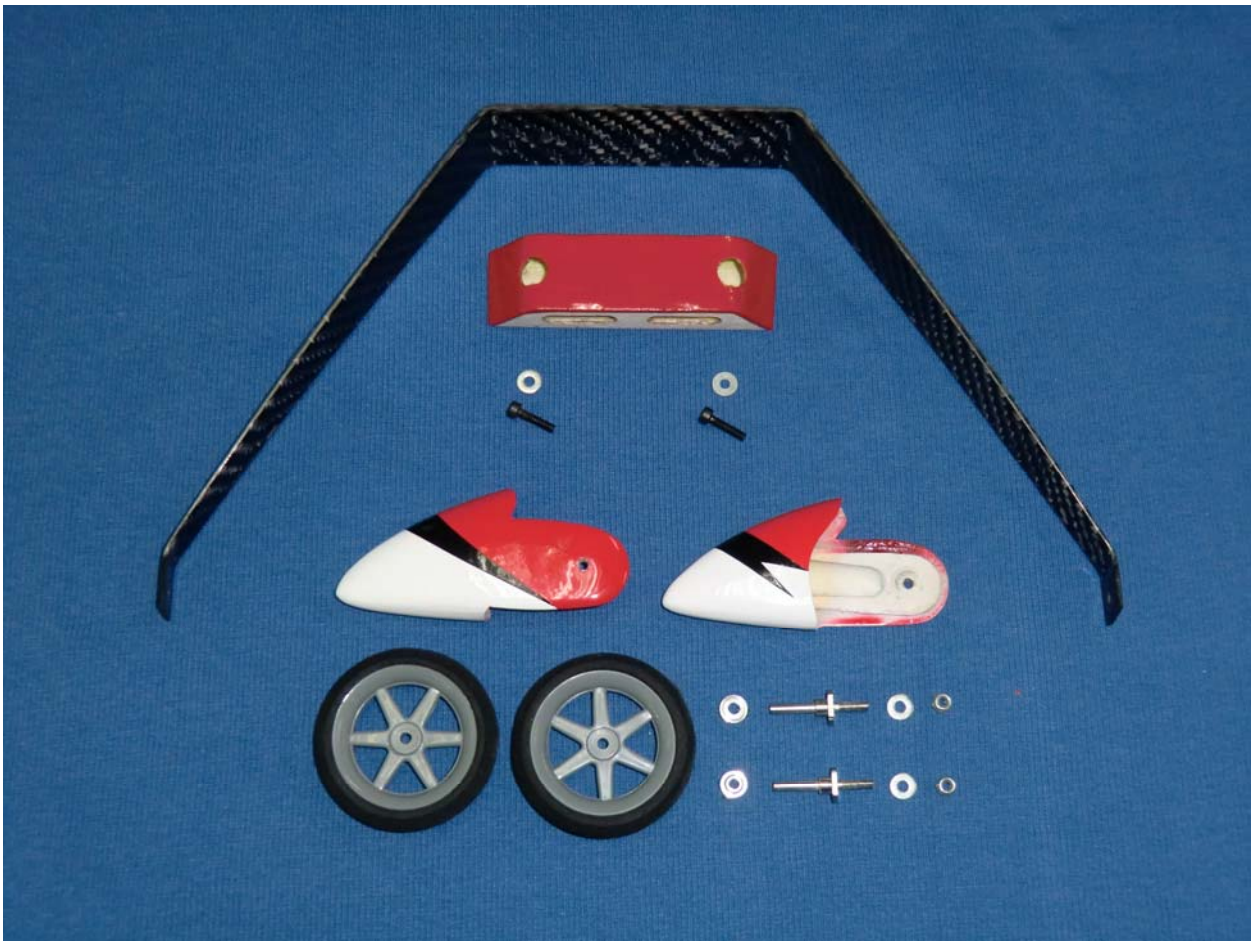
6. Use the screws provided by the servo manufacturer to secure the aileron servo in the designated location. 1 screw installed in the center hole at each end of the servo is adequate to secure the servo. Make sure the output shaft is positioned toward the trailing edge of the wing.



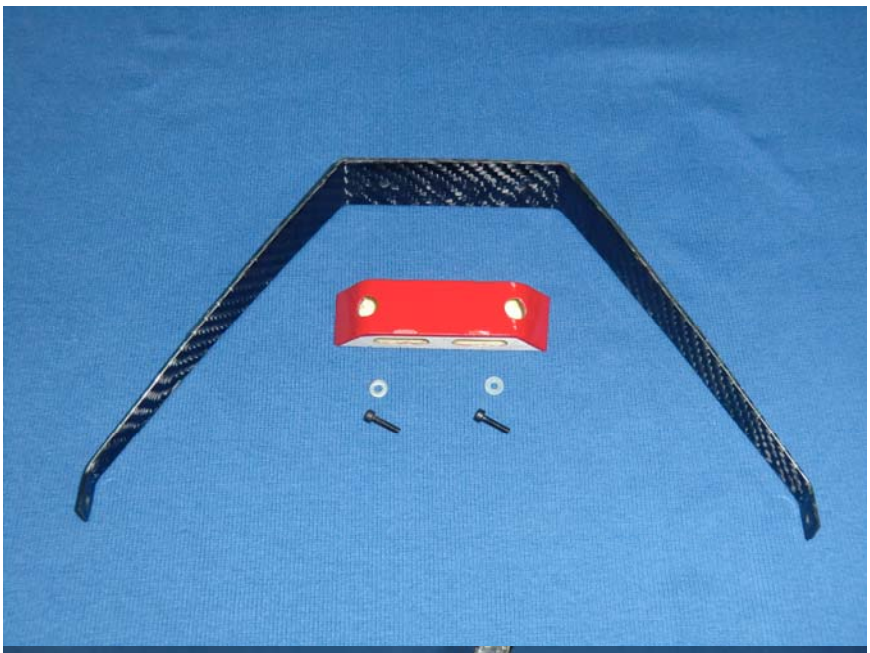
7. Locate the 2 threaded pushrods that are the same size and 4 micro ball links along with 4 2mm screws, nuts and washers. Thread the ball links onto each end of the pushrods and secure to the servo arm and control horn with the 2 mm hardware as shown in the picture. Use the longest arm provided with your servo.

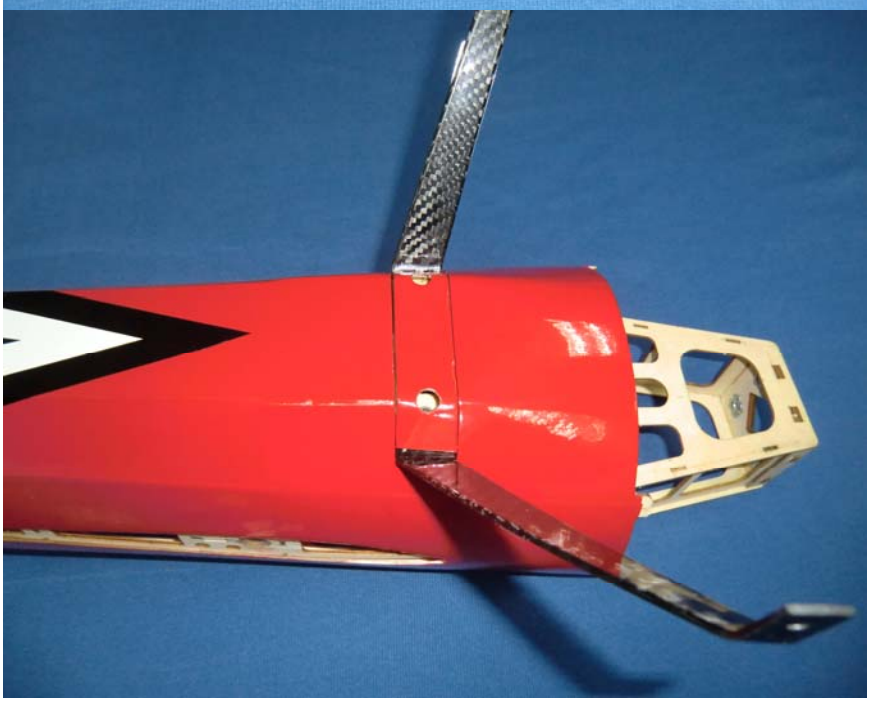
Repeat this process for the other wing half.

8. Locate the carbon fiber main landing gear, 2 axles, 2 washers, 2 locking nuts, 2 wheels, 2 wheel collars and 2 wheel spats from the hardware package. Drill a 3 mm hole through the spat to accept the threaded portion of the axle as shown in the picture below. Place the threaded portion of the axle through the hole in the wheel spat, through the hole in the carbon gear, slide a washer over the threaded portion and screw the lock nut onto the axle. Tighten the nut securely making sure the spat is in the proper position. Place the wheel onto the axle and secure with a wheel collar. Repeat this process for the remaining wheel/spat. This is probably better explained in the following series of pictures.



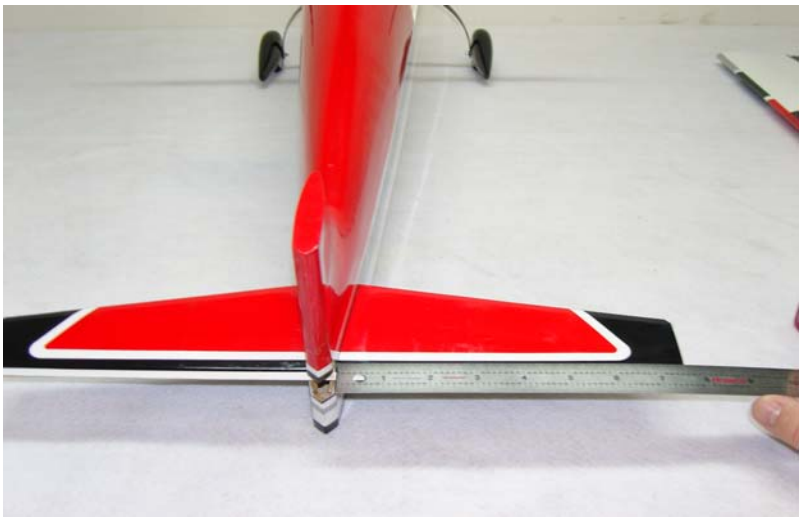
9. Locate the fuselage, 2-3mm socket head cap bolts, 2 washers and the landing gear cover. Secure the landing gear and gear cover to the fuselage by inserting a the 2 3mm screws into a washer, through the hole in the gear cover and carbon fiber gear and into the pre-installed blind nut in the fuselage. Make sure to use a drop of blue Loctite on each screw to prevent them from backing out.



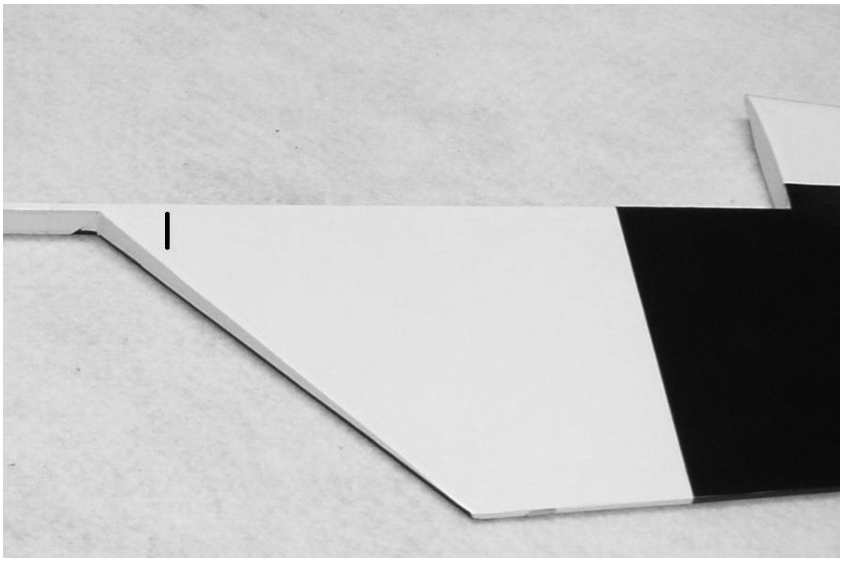


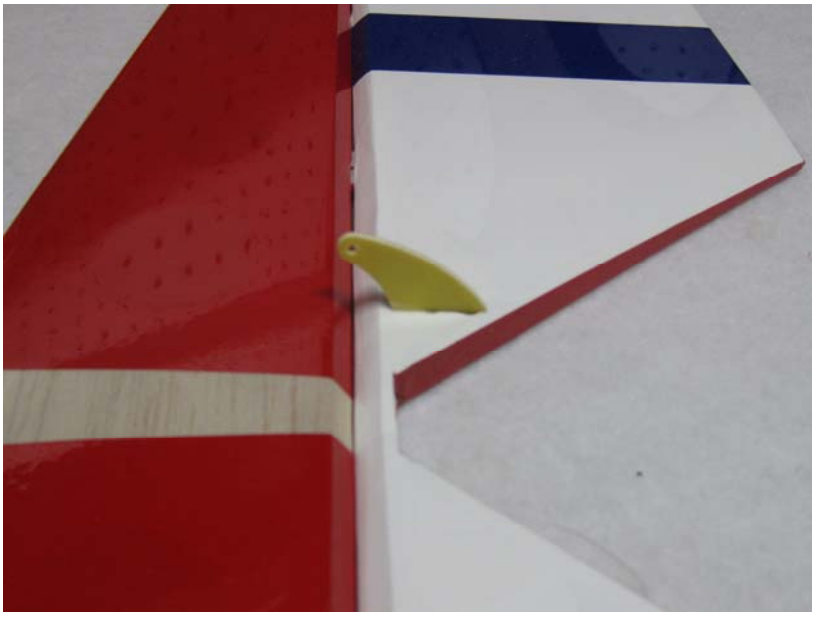
10. Locate the horizontal stabilizer/elevator assembly and slide the elevator off of the hinges. Use a razor saw to remove portion of the rudder post located behind the elevator slot.

11. Insert the stabilizer into its slot and the carbon fiber wing tube into the plastic sleeve. Use a ruler to insure that the stabilizer is centered in its slot and compare the stabilizer to the wing tube to make sure it is properly aligned. Sand or shim the slot if necessary to ensure proper alignment. Secure the stabilizer with CA.



12. Remove the covering over the right slot on the bottom of the elevator where the elevator control horn will be installed. The elevator horn is the one with the shortest shank that is glued into the surface. Scuff the portion of the control horn that will insert into the elevator with sandpaper. Secure the control horn with medium CA.



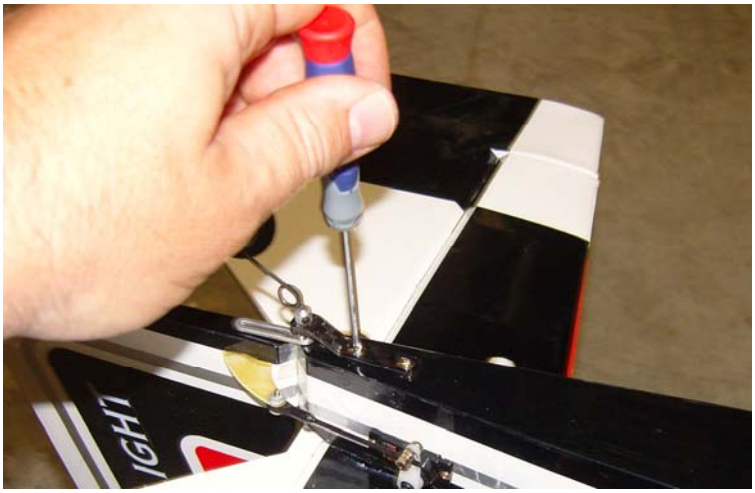


13. Slide the elevator onto the hinges in the stabilizer and secure with thin CA. Again a fresh bottle of CA and a fine glue tip work best here.

14. Remove the covering over the slot in the lower right side of the rudder where the rudder control horn will be installed. Scuff the portion of the control horn that will glue into the surface and secure the rudder control horn with medium CA.

15. Using the same process as with the ailerons and elevator, slide the rudder onto the hinges and secure to the vertical stabilizer with thin CA.

16. Locate the carbon fiber tailwheel assembly in the hardware package. Secure the tailwheel bracket to the bottom rear of the fuselage with the provided wood screws. Make sure the pivot point of the assembly is over the hinge line of the rudder for best results.



17. Secure the tiller using the provided screw, but do not over tighten as the tiller should be able to move on the screw as the rudder is deflected.

18. Place the tailwheel wire in the proper position, aligned with the rudder and lock into place with the 2 set screws.

19. Use the hardware provided with the servos to install the rudder and elevator servos in their respective location in the rear of the aircraft. From the pilot's perspective the rudder servo mounts on the right side of the fuselage and the elevator servo mounts on the left side. The elevator servo should have the output shaft toward the rear of the aircraft while the rudder servo output shaft should be toward the front of the aircraft.

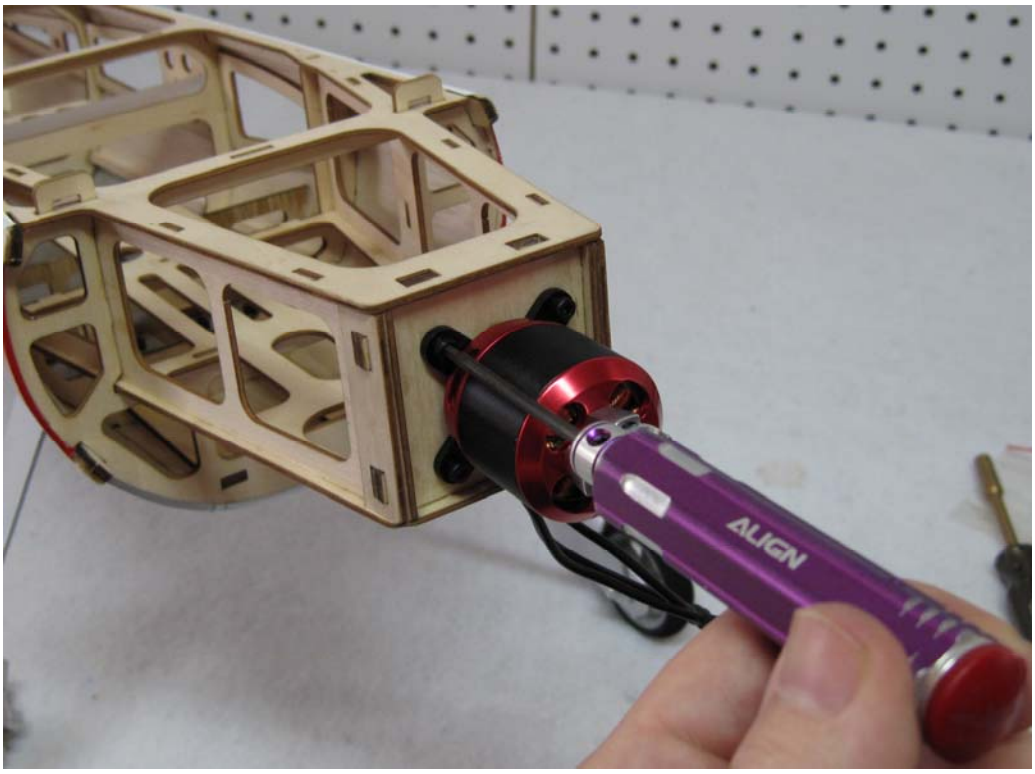
20. The rudder and elevator servo linkages assemble and are installed just like the aileron linkage. For maximum elevator travel we have included a G10 control horn which is bolted to the stock control horn provided with the servo. We have found it easiest to tack glue the G10 arm to the nylon arm and then using the holes in the nylon arm as a guide, drill through the composite arm. Secure the arm with the provided screws and bolts. The remaining portion of the linkage installation is the same as the other control surfaces.

21. Next lets prepare the Torque 2814/820 for mounting. First install the retaining collar onto the motor shaft and secure with the set screw. Make sure to use blue Loctite on all motor bolts!

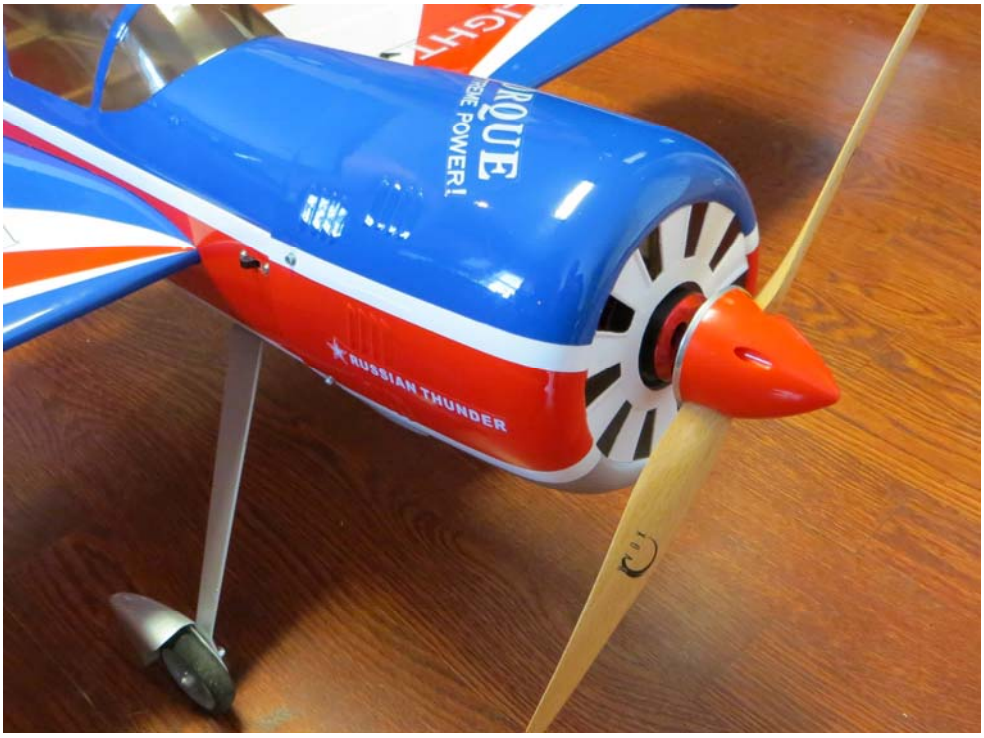
22. Slide the black radial mount over the shaft and collar and retain using the 4 tapered Phillips head screws.

23. Install the prop adapter onto the front of the motor using the 4 slotted head screws.

24. Mount the motor using the supplied 3mm black socket head cap bolts which are threaded into the blind nuts which are pre-installed in the motor mount plate. Be sure to put a drop of blue Loctite onto each bolt to prevent them from backing out. <u>Be sure to add some CA to all motor box joints.</u>

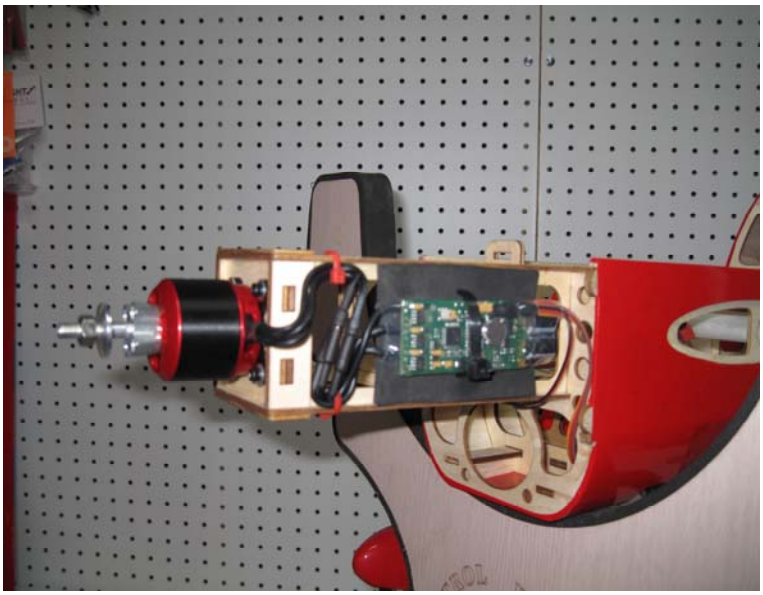


25. For quick, easy and accurate mounting of the cowl we recommend the following method. Tear 4 short pieces of masking tape from a roll. Place each piece of tape on the side of the fuselage so that each piece corresponds with one of the 4 cowl mounting tabs. Use a fine tipped marker to mark the location of the center of each mounting tab. Roll the tape back and slide the cowl into position. Install an Extreme Flight 52mm spinner onto the motor shaft for reference and once satisfied with the cowl position roll the tape back into place and secure the cowl. Use a 1/16" drill bit to drill a hole at the location of the dot on each piece of tape. Remove the tape and secure the cowl with 4 of the included small wood screws that have large heads. Very simple!



26. Use a sharp hobby knife to remove the covering from the opening in the bottom of the fuselage under the canopy to allow cooling air to exit the fuselage.

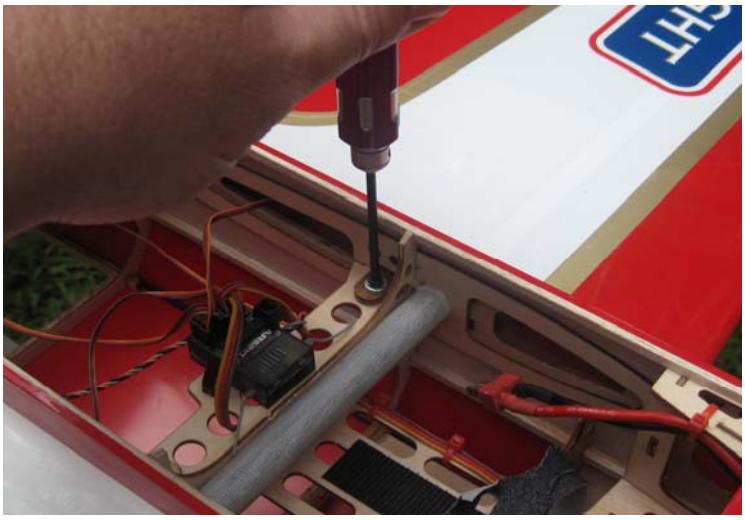
27. Use nylon cable ties or Velcro to secure the ESC to the bottom or side of the motor box.



28. Place a strip of Velcro onto the battery tray and onto your battery and use a Velcro strap around the battery and tray to prevent the battery from being ejected during high G maneuvers. Mount your receiver on the wing retention cross brace.

29. If using the included Side Force Generators now is the time to mount them. Each SFG mounts using 2 3mm thumb screws and 2 clear plastic washers. There is also a clear spacer that fits between the wing tip and SFG to prevent the SFG from interfering with the aileron movement. There are 2 laser cut holes in each SFG which correspond with 2 laser cut holes in the tip of each wing. Insert the bolts into the plastic washers and through the laser cut holes in the SFG and the holes in the clear spacer. Mount the SFG onto the wing tip by inserting the 2 bolts into the pre-installed blind nuts in the tip of the wing.

30. Slide the carbon fiber wing tube into the fuselage and the wings onto the tube. Secure to the fuselage using the 2 3mm bolts and washers inserted through the tabs and into the pre-installed blind nuts.



<u>Set-up and flying tips</u>- The CG range for the YAK-54 EXP starts at the front of the wing tube and extends to the rear of the wing tube. There is plenty of room on the battery tray to move your battery to achieve this CG location. Depending on your flying style you can adjust the position of the battery to alter the CG to accommodate your preferences. For this type of aircraft where I am going to predominantly fly aggressive 3D I typically set the airplane up with a neutral CG, meaning that when the aircraft is flown inverted straight and level it requires no down elevator to maintain altitude. If your flying style leans more toward precision aerobatics then I recommend setting your CG using the 45 degree line test. Fly the aircraft from left to right or right to left, whichever direction you are more comfortable with at 3/4 to full throttle. Pull the aircraft to a 45 degree up line and establish this line and immediately roll the aircraft inverted. Establish this line and let go of the elevator stick. Ideally the aircraft will continue to track on that 45 degree line for several hundred feet before slowly starting to level off. Adjust the position of your battery to achieve this flight condition. Once satisfied with the location of your CG scribe a mark on the battery tray so that you can position the battery in the same location each flight and achieve the same feel and flight characteristics each flight.

I also highly recommend taking the time to properly set up your rates and exponential settings. Setting up low rates for precision maneuvers and high rates for aggressive aerobatics and 3D flight will allow you to experience the best attributes of the YAK-54 EXP or any aircraft for that matter. The included elevator servo arm will allow for close to 80 degrees of throw! While this is great for really aggressive tumbling maneuvers, positive and negative waterfalls and straight down dropping elevators, it can wreak havoc on stable harriers, especially if you are just learning the maneuver. If your radio will allow I suggest setting up 3 elevator rates or a flight condition that will allow you a rate for precision flying, another for harriers and the majority of 3D maneuvers and a final rate with as much travel as you can get for the crazy tumbles and flips.

Here are some suggested rates to get started with. These are the rates and exponential values I feel comfortable with. They may feel awkward to you and if so please adjust to your taste.

Elevator: Low rate-8-10 degrees; 15-20% Exponential

3D rate-45-50 degrees; 40-50% Exponential

Insane tumble rate: As much as possible! 65-70% Exponential

Rudder: Low rate-20 degrees; 45-50% Exponential

3D rate- As much as possible; 60-70% Exponential

Aileron: Low rate-15-20%; 40-45% Exponential

3D rate- As much as possible; 50-60% Exponential

TORQUE